

## REMARKS

Claims 1 to 21 and 24 to 27 are in the case. Claim 1 has been amended. Support for the amendment to claim 1 can be found throughout the specification.

Applicants thank the Examiner for indicating the allowability of claims 7, 8, 13 to 17, 19 to 21, 26, and 27.

### Claim Rejections Under 35 U.S.C. § 102

The Examiner rejected claims 1 to 6 and 18 under 35 U.S.C. § 102(b) as being anticipated by Spencer (US Patent No. 1,677,153). Insofar as the rejection might apply to the claims as amended herein, the rejection is respectfully traversed for the following reasons.

Firstly, Applicants respectfully disagree with the Examiner's characterization of Spencer. The Examiner stated on page 2 of the Office Action that Spencer discloses a method of enhancing plant growth comprising treating soil with hydrogen. However, Spencer does not specifically teach treating soil with hydrogen gas, which is taught and claimed by Applicants. Rather, Spencer teaches treating soil with air.

The Examiner's position is that Spencer anticipates claim 1 because air inherently contains hydrogen. Applicants point out that the amount of hydrogen in air is very small—about 0.4 to 1.0 ppm (parts per million)—which is not enough to produce a plant growth enhancing effect. See, for example, the experiments described in the instant specification (Examples 1 to 8), where air was used as the control to evaluate growth-enhancing effects of treating soil with H<sub>2</sub> gas. The data (e.g., Tables 1 to 8, Figures 1 and 2) indicate that air had no growth-enhancing effect on soil, but treatment of soil with H<sub>2</sub> gas at a concentration of H<sub>2</sub> greater than that in air enhanced plant growth. Applicants therefore submit that Spencer, in treating soil with air, does not anticipate claim 1 because air does not contain sufficient hydrogen to enhance plant growth, as required by claim 1.

Nevertheless, in an effort to advance prosecution, Applicants have amended claim 1 as follows:

A method for enhancing plant growth or yield, comprising treating soil with H<sub>2</sub> gas at a concentration greater than the concentration of H<sub>2</sub> in air, and growing a plant in the soil.

Thus, as amended, claim 1 requires that the concentration of hydrogen gas provided to soil is greater than the concentration of hydrogen gas in air.

As Spencer does not teach or even suggest treating soil with H<sub>2</sub> gas at a concentration greater than that of H<sub>2</sub> in air to improve plant growth or yield, withdrawal of the rejection is believed to be in order and is respectfully requested.

Claim 2 was rejected on the grounds that Spencer further discloses combining the soil treated with hydrogen with soil not treated with hydrogen gas, and growing a plant in the combined soil. In view of claim 1 as amended herein, Applicants submit that this rejection is overcome.

Claim 3 was rejected on the grounds that Spencer further discloses the treated soil being between 5 and 100 %, by volume. In view of claim 1 as amended herein, Applicants submit that this rejection is overcome.

Claim 4 was rejected on the grounds that Spencer further discloses a plant growing in the soil. In view of claim 1 as amended herein, Applicants submit that this rejection is overcome.

Claim 5 was rejected on the grounds that Spencer further discloses a plant that is planted in soil not treated adjacent a volume of soil treated. In view of claim 1 as amended herein, Applicants submit that this rejection is overcome.

Claim 6 was rejected on the grounds that Spencer further discloses that the soil treated is soil in which the plant is already growing. In view of claim 1 as amended herein, Applicants submit that this rejection is overcome.

Claim 18 was rejected on the grounds that Spencer further discloses the hydrogen gas provided to the soil via tubing or hollow tubes. In view of claim 1 as amended herein, Applicants submit that this rejection is overcome.

Claims 1, 9 to 12, 24, and 25 were rejected under 35 U.S.C. § 102(b) as being anticipated by Eisbrenner et al. It appears that the Examiner's position is that Eisbrenner et al. teach a method of enhancing plant growth comprising treating soil, wherein the soil treatment comprises growing in the soil a legume containing HUP+ bacteria, and growing a plant in the soil.

Applicants respectfully disagree with the rejection for the following reasons. Eisbrenner et al. teaches that hydrogen gas production by a legume results in energy loss for the legume. Eisbrenner et al. suggests that stopping hydrogen production by using a HUP+ strain of bacteria reduces energy loss, resulting in enhanced growth and yield **of the legume**.

In contrast, the invention teaches that there is an advantage to hydrogen production by a legume, **n t for the legume**, but for the subsequent crop. The invention teaches that use of a bacteria selected for its ability to produce hydrogen; that is, to **prom te** hydrogen production of the legume, is beneficial for the subsequent plant. An example of such a bacteria is a HUP- strain of bacteria. This is completely opposite to the teaching of Eisbrenner er al. Moreover, the teaching of the invention is contrary to all conventional understanding about the role of legumes and HUP+/HUP- strains of bacteria in promoting plant growth.

In view of the foregoing, Applicants submit that the rejection of claims 1, 9 to 12, 24, and 25 under 35 U.S.C. § 102(b) is without merit. Withdrawal of the rejection and reconsideration are respectfully requested.

Applicants submit that claims 1 to 21 and 24 to 27 are in condition for allowance and look forward to receiving a Notice of Allowability in the near future. Should the Examiner wish to discuss this application, he is requested to call the undersigned agent at (613) 533-2342.

Please deduct any fee(s) which may be required from our deposit account No. 17-0110.

Respectfully submitted,



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